



# **2012 DOE Manufacturing Workshop Barriers to Low-Cost Manufacturing**

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# Unique capabilities from SSL



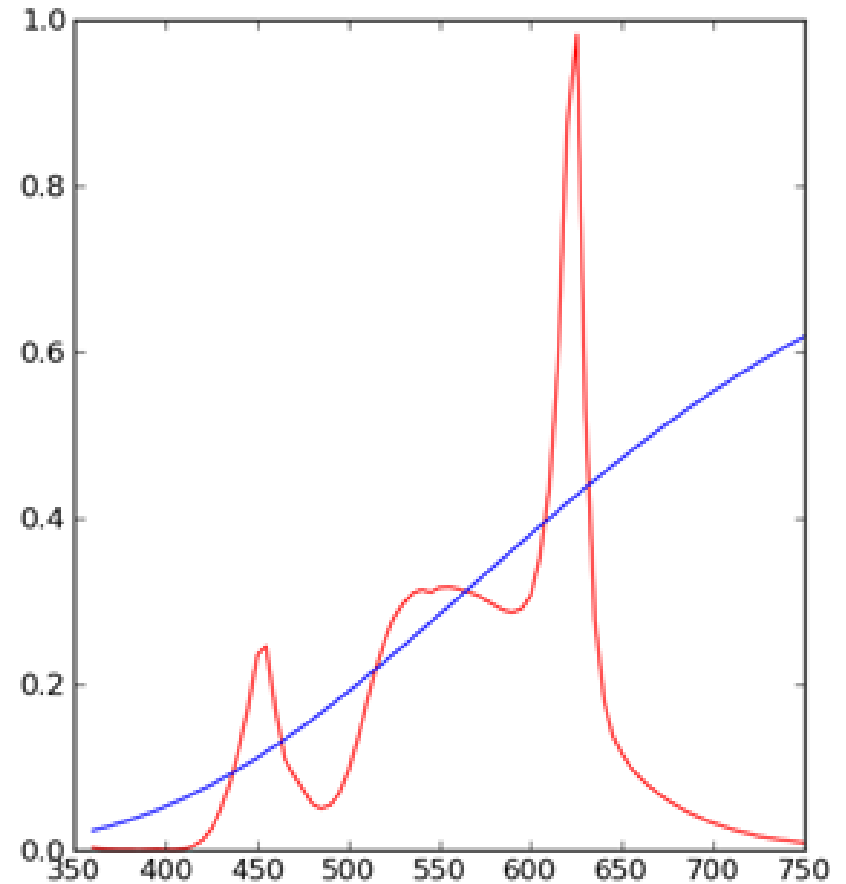
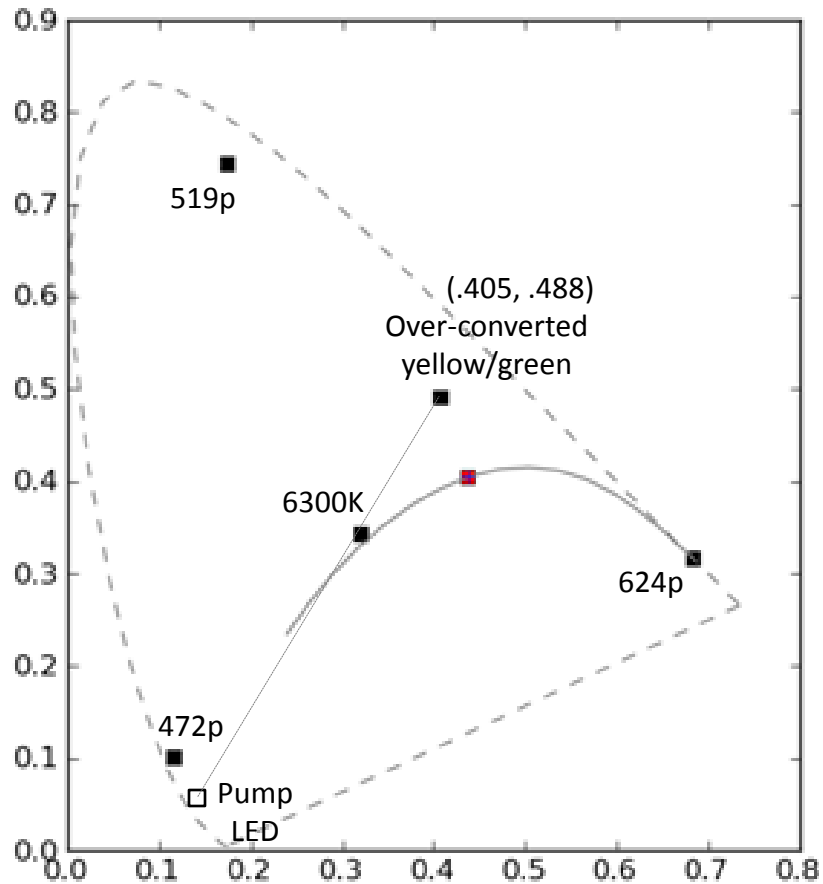
- Tunable spectrum – more like nature
  - Fewer SKU's reduce cost and delivery
  - Less binning, less inventory, reduce cost
  - Add value to increase energy savings
- Large surfaces – more like nature
  - Large acrylic sheets – 8' x 12'
  - Flexible daughter sizes, flexible extraction
  - Reduce glare, improve comfort, increase energy savings
- Long PCB/MCPCB – one piece “fluorescent” and beyond
  - Efficient processing of 4' lengths

# What's needed

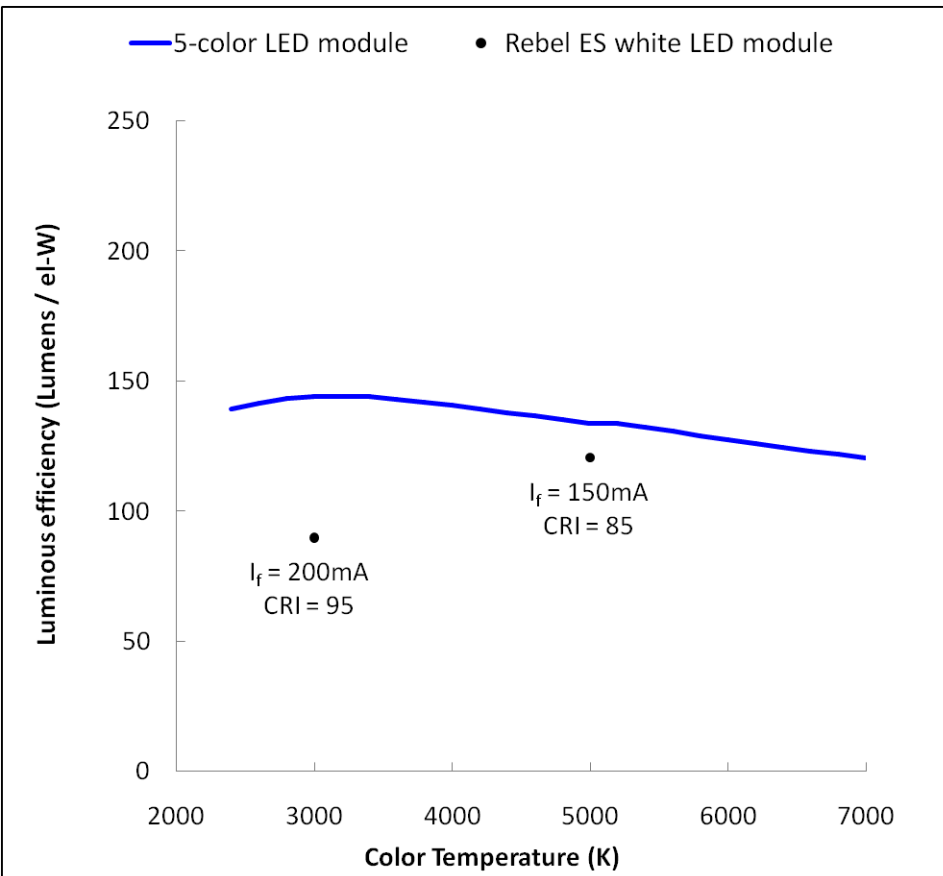
- Tunable spectrum – more like nature
  - Fast testers to characterize and program luminaires
- Large surfaces – more like nature
  - Programmable machines to handle, extract, cut, and polish light guides
  - Low cost molding of large (4' +) irregular optical shapes
- Long PCB/MCPCB – one piece “fluorescent” and beyond
  - Machines to fabricate, populate, reflow, and test large PCBs.

# Tunable Spectrum

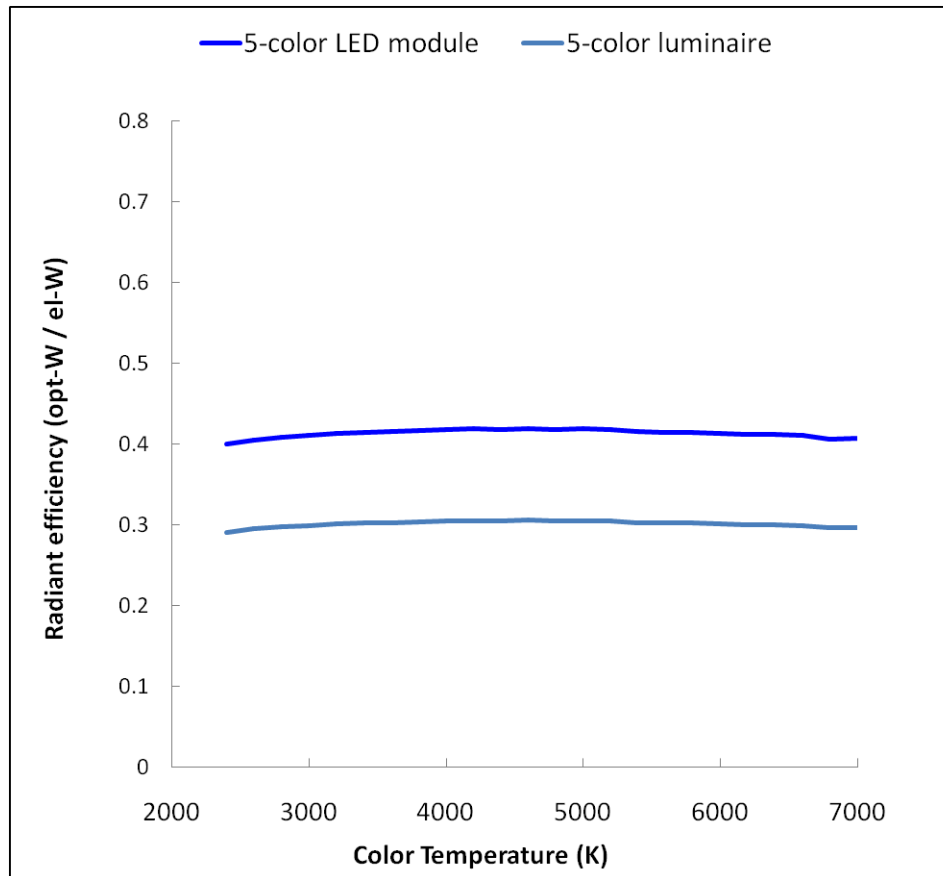
Example: 3,000K, 144 lm/w (LED), 93 CRI



# LUMINOUS EFFICIENCY

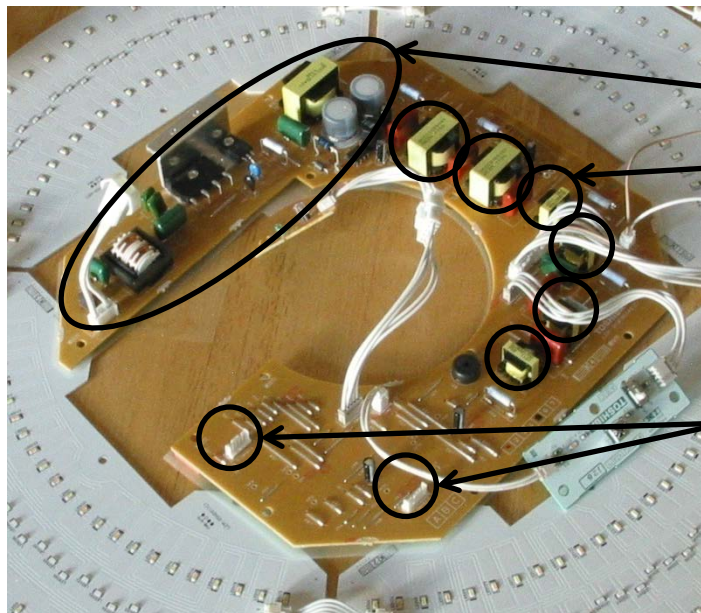
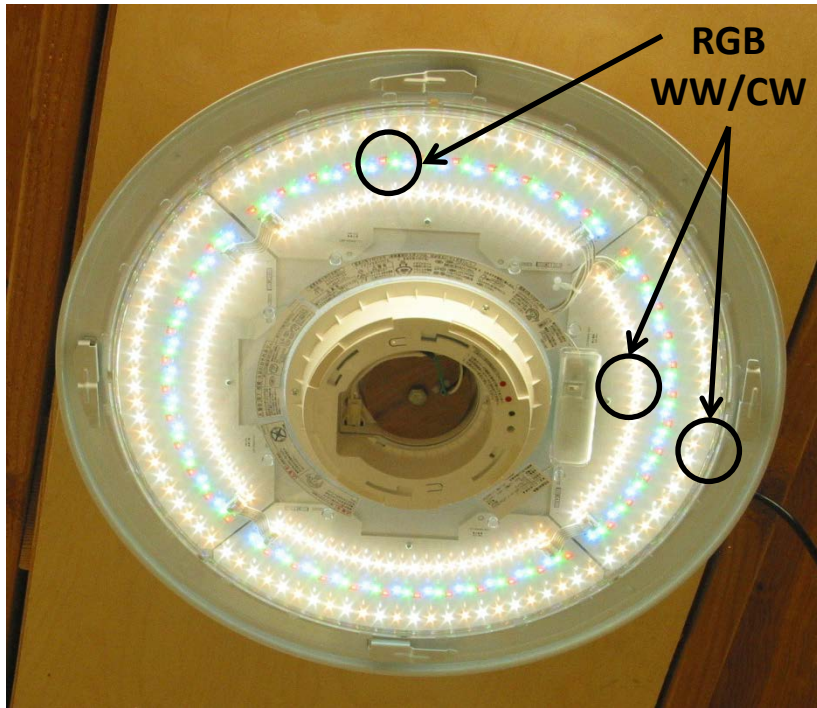


# RADIANT EFFICIENCY



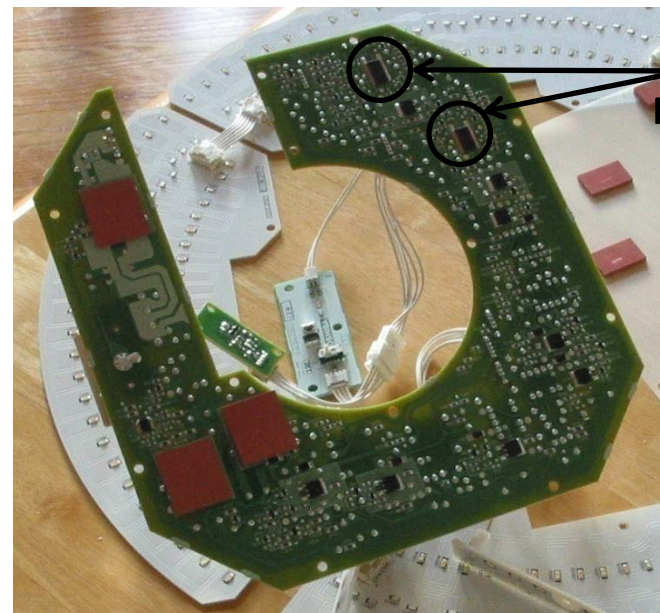
Well designed luminaire with modest beam shape and mixing requirements:

**{** 10% loss, power supply  
10% loss, optics  
5% loss, heat  
5% loss, manufacturing tolerance



Primary AC/DC  
145VDC out  
6 current  
drivers

Factory  
Programming



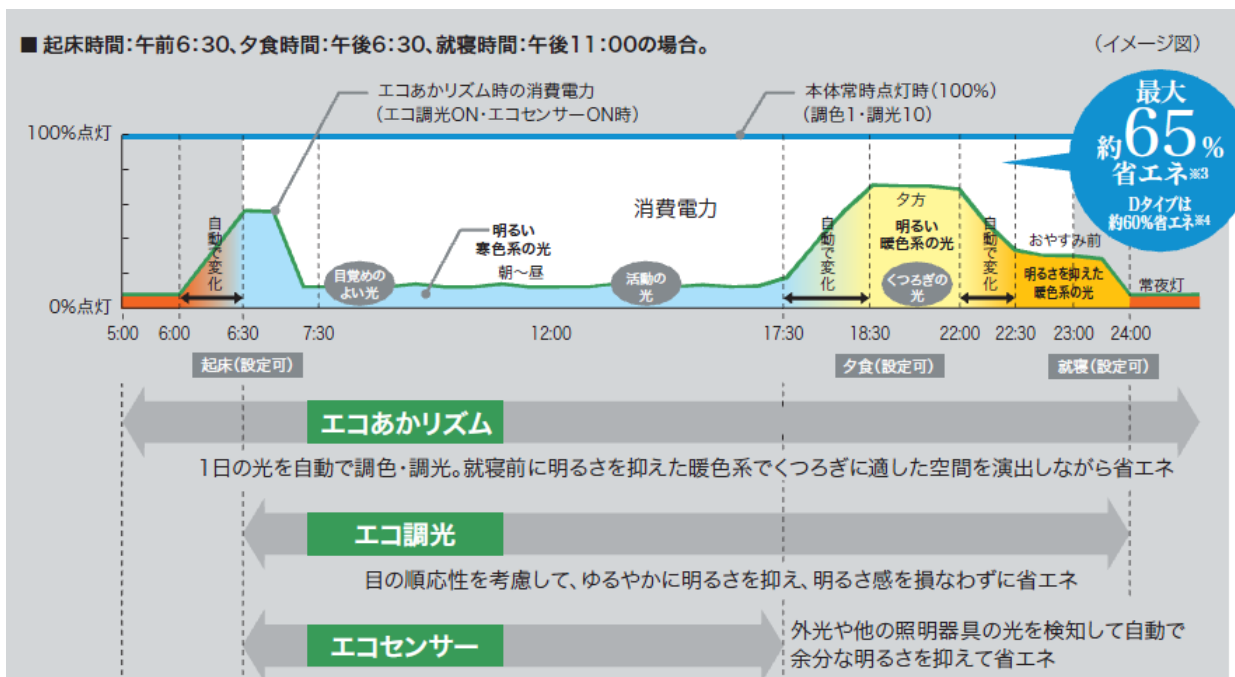
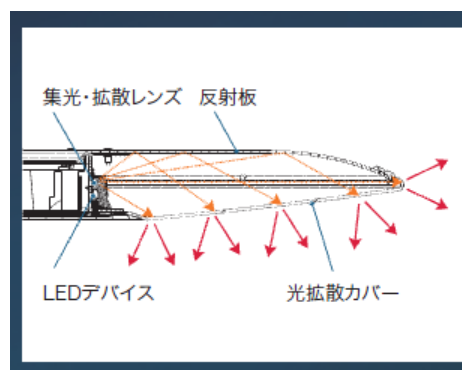
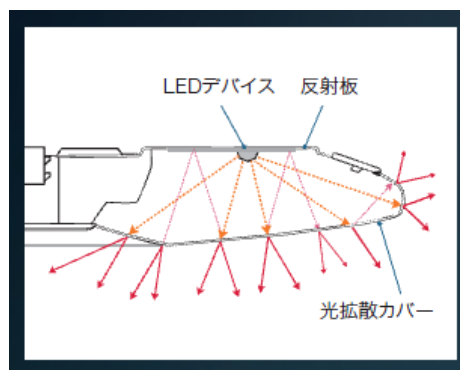
Dual  
Processors

Toshiba LEDH82010YX-LC



# 業界最高水準の効率<sup>※1</sup><sup>※2</sup> 83.6 lm/Wを実現。(DL-C603V)

## シャープのLEDシーリングライト。



# **“GLOWING WALLS” IALD AWARD WINNER 2009**





# Fraunhofer Institute, LEiDs GmbH ceiling tiles

– RGB and white LEDs simulate sky with moving clouds



The dynamic luminous ceiling gives office staff the pleasant feeling that they are working under the open sky. © Fraunhofer IAO

<http://www.fraunhofer.de/en/press/research-news/2012/january/sky-light-sky-bright.html>